

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

Claim Amendments

This listing of the claims will replace all prior versions,
and listings, of claims in the application:

Claim 1 (currently amended): An apparatus for producing
secondary electrons, comprising:

at least one primary electrode for producing primary
electrons;

an acceleration electrode for accelerating the primary
electrons; and

a secondary electrode for producing secondary electrons when
the accelerated primary electrons arrive, said secondary
electrode having at least one aperture opening formed therein.

Claim 2 (currently amended): The apparatus according to claim
1, wherein:

~~said secondary electrode is formed with at least one aperture
opening,~~

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

said aperture opening extends obliquely through said secondary electrode and/or said aperture opening prevents primary electrons from passing through.

Claim 3 (original): The apparatus according to claim 2, wherein said aperture opening is formed by an elongated hole defined by side surfaces configured parallel to one another.

Claim 4 (original): The apparatus according to claim 2, wherein:

said aperture opening is defined by side surfaces that overlap in a direction at which the primary electrons arrive into said aperture opening.

Claim 5 (currently amended): The apparatus according to claim [[2]] 3, wherein:

said secondary electrode has a surface in which said aperture opening is formed;

said surface has a normal; and

said side surfaces of said aperture opening are configured aligned with said normal.

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

Claim 6 (original): The apparatus according to claim 2,
wherein said aperture opening is formed by laminates.

Claim 7 (currently amended): The apparatus according to claim
1, wherein:

said ~~secondary electrode is formed with~~ at least one aperture
opening ~~having~~ has an aperture direction configured at an
angle of a magnitude of between 30° and 70° with respect to a
normal of said secondary electrode near said aperture opening.

Claim 8 (original): The apparatus according to claim 7,
wherein:

said angle has a magnitude of 55° with respect to the normal
of said secondary electrode near said aperture opening.

Claim 9 (currently amended): The apparatus according to claim
1, wherein:

said ~~secondary electrode is formed with~~ at least one aperture
opening ~~having~~ has an aperture direction configured at an
angle defined by: $\tan (90^\circ - w) = d/b$; and

Applic. No. 10/718,777

Amdt. dated March 30, 2007

Reply to Office action of January 29, 2007

w is said angle, d is a thickness of said secondary electrode, and b is a width of said aperture opening.

Claim 10 (currently amended): The apparatus according to claim 1, wherein:

said secondary electrode has side walls defining [[an]] said aperture opening;

said side walls are spaced a distance apart; and

said distance between said side walls is between 2 mm and 6 mm.

Claim 11 (original): The apparatus according to claim 10, wherein said distance between said side walls is 4 mm.

Claim 12 (original): The apparatus according to claim 1, wherein:

said at least one primary electrode includes only one primary electrode.

Claim 13 (original): The apparatus according to claim 1, further comprising:

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

a plurality of primary electrodes;

said secondary electrode formed with a plurality of aperture openings;

each one of said plurality of primary electrodes associated with a respective one of said plurality of aperture openings; and

at least one of said plurality of aperture openings being at a different inclination angle than another one of said plurality of aperture openings.

Claim 14 (currently amended): The apparatus according to claim 1, wherein:

~~said secondary electrode is formed with at least one aperture opening,~~

said secondary electrode is made of aluminum or of an aluminum alloy.

Claim 15 (original): The apparatus according to claim 1, wherein:

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

said secondary electrode is made of Al 99 or of an even purer aluminum.

Claim 16 (currently amended): The apparatus according to claim 1, wherein:

~~said secondary electrode is formed with at least one aperture opening, and~~

said secondary electrode is made of graphite or contains at least 60% by mass of graphite.

Claim 17 (currently amended): The apparatus according to claim 1, wherein:

~~said secondary electrode is formed with at least one aperture opening, and~~

said secondary electrode is made of aluminum oxide.

Claim 18 (currently amended): The apparatus according to claim 1, wherein:

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

~~said secondary electrode is formed with at least one aperture
opening, and~~

said secondary electrode has a mean surface roughness of
between 5 and 8 μm .

Claim 19 (original): The apparatus according to claim 1,
wherein:

said acceleration electrode is formed with at least 100
openings.

Claim 20 (original): The apparatus according to claim 1,
wherein:

said acceleration electrode is formed at least 500 openings.

Claim 21 (original): The apparatus according to claim 1,
wherein:

said acceleration electrode is formed with at least 1000
openings.

Claim 22 (original): The apparatus according to claim 19,
wherein:

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

said acceleration electrode includes a wire mesh having at least 100 holes or meshes.

Claim 23 (original): The apparatus according to claim 1, wherein:

said acceleration electrode is formed with at least 100 openings; and

said acceleration electrode is made of aluminum or an aluminum alloy.

Claim 24 (original): The apparatus according to claim 1, wherein:

said acceleration electrode is formed with at least 100 openings; and

said acceleration electrode is made of Al 99.9 or an even purer aluminum.

Claim 25 (original): The apparatus according to claim 1, wherein:

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

said acceleration electrode is formed with at least 100
openings; and

said secondary electrode has a mean surface roughness; and

said acceleration electrode has a mean surface roughness of
less than said mean surface roughness of said secondary
electrode.

Claim 26 (original): The apparatus according to claim 25,
wherein:

said mean surface roughness of said acceleration electrode is
between 2.5 and 6 μm .

Claim 27 (original): The apparatus according to claim 1,
further comprising:

a free space for an ion beam to pass through; and

a workpiece;

said ion beam being directed at said workpiece.

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

Claim 28 (original): The apparatus according to claim 27,
wherein said workpiece is a semiconductor substrate.

Claim 29 (original): The apparatus according to claim 1,
further comprising:

a free space used for holding a material or workpiece to be
processed.

Claim 30 (original): The apparatus according to claim 1,
further comprising:

a free space for an ion beam to pass through;

said primary electrode configured parallel to a propagation
direction of said ion beam.

Claim 31 (original): The apparatus according to claim 1,
further comprising:

a free space for an ion beam to pass through;

said primary electrode configured transversely with respect to
a propagation direction of said ion beam.

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

Claim 32 (original): An apparatus for producing secondary electrons, comprising:

at least one primary electrode for producing primary electrons; and

a secondary electrode for accelerating the primary electrons;

said secondary electrode formed with at least one aperture opening for preventing primary electrons from passing through.

Claim 33 (original): The apparatus according to claim 32, wherein:

said aperture opening extends obliquely through said secondary electrode.

Claim 34 (original): The apparatus according to claim 33, wherein said aperture opening is formed by an elongated hole defined by side surfaces configured parallel to one another.

Claim 35 (original): The apparatus according to claim 33, wherein:

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

said aperture opening is defined by side surfaces that overlap in a direction at which the primary electrons arrive into said aperture opening.

Claim 36 (currently amended): The apparatus according to claim ~~[[33]]~~ 34, wherein:

said secondary electrode has a surface in which said aperture opening is formed;

said surface has a normal; and

said side surfaces of said aperture opening are configured aligned with said normal.

Claim 37 (original): The apparatus according to claim 33, wherein said aperture opening is formed by laminates.

Claim 38 (original): The apparatus according to claim 32, wherein:

said aperture opening has an aperture direction configured at an angle of a magnitude of between 30° and 70° with respect to a normal of said secondary electrode near said aperture opening.

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

Claim 39 (original): The apparatus according to claim 38,
wherein:

said angle has a magnitude of 55° with respect to the normal
of said secondary electrode near said aperture opening.

Claim 40 (original): The apparatus according to claim 32,
wherein:

said opening has an aperture direction configured at an angle
defined by: $\tan (90^\circ - w) = d/b$; and

w is said angle, d is a thickness of said secondary electrode,
and b is a width of said aperture opening.

Claim 41 (original): The apparatus according to claim 32,
wherein:

said secondary electrode has side walls defining said aperture
opening;

said side walls are spaced a distance apart; and

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

said distance between said side walls is between 2 mm and 6 mm.

Claim 42 (currently amended): The apparatus according to claim [[32]] 41, wherein said distance between said side walls is 4 mm.

Claim 43 (original): The apparatus according to claim 32, wherein:

said at least one primary electrode includes only one primary electrode.

Claim 44 (original): The apparatus according to claim 32, further comprising:

a plurality of primary electrodes;

said secondary electrode formed with a plurality of aperture openings;

each one of said plurality of primary electrodes associated with a respective one of said plurality of aperture openings;
and

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

at least one of said plurality of aperture openings being at a different inclination angle than another one of said plurality of aperture openings.

Claim 45 (original): The apparatus according to claim 32,
wherein:

said secondary electrode is made of aluminum or of an aluminum alloy.

Claim 46 (original): The apparatus according to claim 32,
wherein:

said secondary electrode is made of Al 99 or of an even purer aluminum.

Claim 47 (original): The apparatus according to claim 32,
wherein:

said secondary electrode is made of graphite or contains at least 60% by mass of graphite.

Claim 48 (original): The apparatus according to claim 32,
wherein:

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

said secondary electrode is made of aluminum oxide.

Claim 49 (original): The apparatus according to claim 32,
wherein:

said secondary electrode has a mean surface roughness of
between 5 and 8 μm .

Claim 50 (original): The apparatus according to claim 32,
further comprising:

a free space for an ion beam to pass through; and

a workpiece;

said ion beam being directed at said workpiece.

Claim 51 (original): The apparatus according to claim 50,
wherein said workpiece is a semiconductor substrate.

Claim 52 (original): The apparatus according to claim 32,
further comprising:

a free space used for holding a material or workpiece to be
processed.

Applic. No. 10/718,777
Amdt. dated March 30, 2007
Reply to Office action of January 29, 2007

Claim 53 (original): The apparatus according to claim 32,
further comprising:

a free space for an ion beam to pass through;

said primary electrode configured parallel to a propagation
direction of said ion beam.

Claim 54 (original): The apparatus according to claim 32,
further comprising:

a free space for an ion beam to pass through;

said primary electrode configured transversely with respect to
a propagation direction of said ion beam.

Claim 55-62 (cancelled).